

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US04/24151

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : B01D 53/02; B 23P 19/04  
US CL : 29/402.08; 96/130

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 29/402.08; 96/130, 151, 115

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,584,001 A (DECHENE) 22 April 1986 (22.04.1986), See entire patent.	1-7
A	US 4,509,959 A (McCOMBS) 09 April 1985 (09.04.1989), See entire patent.	
A	US 4,373,938 A (McCOMBS) 15 February 1983 (15.02.1983), See entire patent.	
A	US 5,549,736 A (COFFIELD et al.) 27 August 1996 (27.08.1996), See entire patent.	
A	US 4,545,790 A (MILLER et al.) 08 October 1985 (08.10.1985), See Figure 1.	
A	US 4,378,982 A (McCOMBS) 05 April 1983 (05.04.1983), See Figures 1-3.	
A	US 5,827,358 A (KULISH et al.) 27 October 1998 (27.10.1998), See Figures 1 and 2.	

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

09 December 2004 (09.12.2004)

Date of mailing of the international search report

29 DEC 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
Facsimile No. (703) 305-3230

Authorized officer

David P. Bryant

Telephone No. 703-308-1146